

# Assignment #3

110503507 林亞誼

## 1.編譯結果

```
root@DESKTOP-SIDL7N9:~/repo/Cherry/110503507_assignment_2# gcc main.c
root@DESKTOP-SIDL7N9:~/repo/Cherry/110503507_assignment_2# ./a.out
```

Figure 1: Compile file

## 2.執行結果

```
日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步步步三
□□□□□□□□□四
□□□□□□□□□五
□□□□□□□□□六
步步步步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家X
```

```
choose the option(1:play/0:back to last step/s:save the record):
```

Figure 2: Initial interface of X player

```
日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步步步三
□□□□□□□□□四
□□□□□□□□□五
□□□□□□□□□六
步步步步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家X
```

```
choose the option(1:play/0:back to last step/s:save the record): 1
continue
```

```
玩家X[藍棋]請輸入你要移動的棋子:
```

```
7 7
```

```
玩家X[藍棋]請輸入你要放置的位置:
```

```
6 7
```

Figure 3: X player inputs 1 to play and move the piece

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步步步三
□□□□□□□□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家Y
choose the option(1:play/0:back to last step/s:save the record):

```

Figure 4: Initial interface of Y player

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步步步三
□□□□□□□□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家Y
choose the option(1:play/0:back to last step/s:save the record):1
continue
玩家Y[紅棋]請輸入你要移動的棋子:
3 3
玩家Y[紅棋]請輸入你要放置的位置:
4 3

```

Figure 5: Y player inputs 1 to play and move the piece

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步□步步三
□□□□□□步□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家X
choose the option(1:play/0:back to last step/s:save the record): 1
continue
玩家X[藍棋]請輸入你要移動的棋子:
8 8
玩家X[藍棋]請輸入你要放置的位置:
2 2

```

Figure 6: X player captures the piece of Y player

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步步步三
□□□□□□□□四
□□□□□□□□五
□□□□□□□□六
步步步步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家X
choose the option(1:play/0:back to last step/s:save the record): 1
continue
玩家X[藍棋]請輸入你要移動的棋子:
7 7
玩家X[藍棋]請輸入你要放置的位置:
6 6

```

Figure 7: when X player enters wrong value

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步步步三
□□□□□□□□四
□□□□□□□□五
□□□□□□□□六
步步步步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
違反遊戲規則，請重新輸入
玩家X
choose the option(1:play/0:back to last step/s:save the record):

```

Figure 8: X player should input numbers again

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步□步步三
□□□□□□步□□四
□□□□□□□□五
□□步□□□□□□六
步步□步步步步步步七
□□□□□□□飛□八
香桂銀金王金銀桂香九
玩家Y
choose the option(1:play/0:back to last step/s:save the record):0

```

Figure 9: Y player enters 0 to go back to the last step

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步□步步三
□□□□□□步□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家X
choose the option(1:play/0:back to last step/s:save the record):0

```

Figure 10: X player enters 0 to go back to the last step

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步步步三
□□□□□□□□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家Y
choose the option(1:play/0:back to last step/s:save the record):

```

Figure 11: Pawn of Y player returns to initial place

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金角金銀桂□一
□飛□□□□□角香二
步步步步步步□步步三
□□□□□□步□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步步七
□□□□□□□飛□八
香桂銀金王金銀桂香九
VICTORY! 玩家X獲勝

```

Figure 12: X player wins the game

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□□二
步步步步步步□步步三
□□□□□□步□□四
□□□□□□□□五
□□步□□□□□□六
步步□步步步步步七
□角銀□□□□飛香八
香桂□金角金銀桂□九
GAMEOVER! 玩家X輸了

```

Figure 13: X player loses the game

```

日本將棋

9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂□一
□飛□□□□□□香二
步步步步步步□步步三
□□□□□□步□□四
□□□□□□□□五
□□步□□□□□步六
步步□步步步步步七
□□□角□□□飛□八
香□銀金王金銀桂香九
玩家X
choose the option(1:play/0:back to last step/s:save the record): s

```

Figure 14: Once we input s , the record would be saved

```

player X -> xi:7,yi:2,xj:6,yj:2,goalplace:ESC[34m步ESC[0m
player Y -> xi:3,yi:6,xj:4,yj:6,goalplace:ESC[31m步ESC[0m
player X -> xi:8,yi:1,xj:3,yj:6,goalplace:ESC[34m角ESC[0m
player Y -> xi:1,yi:8,xj:2,yj:8,goalplace:ESC[31m香ESC[0m
player X -> xi:3,yi:6,xj:5,yj:4,goalplace:ESC[34m角ESC[0m
player Y -> xi:2,yi:7,xj:5,yj:4,goalplace:ESC[31m角ESC[0m
player X -> xi:9,yi:1,xj:7,yj:2,goalplace:ESC[34m桂ESC[0m
player Y -> xi:5,yi:4,xj:7,yj:2,goalplace:ESC[31m角ESC[0m
player X -> xi:7,yi:8,xj:6,yj:8,goalplace:ESC[34m步ESC[0m
player Y -> xi:7,yi:2,xj:8,yj:3,goalplace:ESC[31m角ESC[0m

```

Figure 15: The record would be printed on [record.txt]

```

    日本將棋
9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步□步步三
□□□□□□步□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步步七
□角□□□□□飛□八
香桂銀金王金銀桂香九
玩家X
choose the option(1:play/0:back to last step/s:save the record/x:replay
the board): 1
continue
玩家X[藍棋]請輸入你要移動的棋子:
8 8 3 3
玩家X[藍棋]請輸入你要放置的位置:
是否要升變?(y/n)

```

Figure 16: If input 'y', the shogi will be promotion

```

    日本將棋
9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂香一
□飛□□□□□角□二
步步步步步步馬步步三
□□□□□□步□□四
□□□□□□□□□五
□□步□□□□□□六
步步□步步步步步步七
□□□□□□□飛□八
香桂銀金王金銀桂香九
玩家Y
choose the option(1:play/0:back to last step/s:save the record/x:replay
the board): 

```

Figure 17: “龍馬” is the promotion of “角”

```

    日本將棋
9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂  一
  飛  二
步步步步步  飛香 三
  步  四
  五
  六
  七
  八
香桂銀金王金銀桂香 九
玩家X
choose the option(1:play/0:back to last step/s:save the record/x:replay
the board): 1
continue
玩家X[藍棋]請輸入你要移動的棋子:
3 2 3 4
玩家X[藍棋]請輸入你要放置的位置:
是否要升變?(y/n)
y

```

Figure 18: "If input 'y', the shogi will be promotion

```

    日本將棋
9|8|7|6|5|4|3|2|1|
香桂銀金王金銀桂  一
  飛  二
步步步步步  龍  香 三
  步  四
  五
  六
  七
  八
香桂銀金王金銀桂香 九
玩家Y
choose the option(1:play/0:back to last step/s:save the record/x:replay
the board): 

```

Figure 19: "龍王" is the promotion of "飛"

## <將棋棋子規則>

```
//B (飛) -----
else if (chessPosition[xi][yi] == Blue(飛))
{
    if (yi == yj)
    {
        for (int i = xi+1; i < xj; i++)
        {
            if (chessPosition[i][yi] != GAP)
                isStandard = 0; //如果初始位置和目標位置之間有棋子，則不符合規則
        }
        for (int i = xi-1; i > xj; i--)
        {
            if (chessPosition[i][yi] != GAP)
                isStandard = 0;
        }
    }
    else if (xi == xj)
    {
        for (int i = yi+1; i < yj; i++)
            if (chessPosition[xi][i] != GAP)
                isStandard = 0;
        for (int i = yi-1; i > yj; i--)
            if (chessPosition[xi][i] != GAP)
                isStandard = 0;
    }
    if ((xi == xj || yi == yj) && isStandard && redOrBlue(xj, yj) != -1) //如果棋子直行、沒有犯規且落點不是藍棋，可以移動
    {
        push1(xi); push2(yi); push3(xj); push4(yj); wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Blue(飛);
        fprintf(record, "player X -> xi:%d, yi:%d, xj:%d, yj:%d, goalplace:%s\n", xi, yi, xj, yj, chessPosition[xj][yj]);
        return;
    }
    else
    {
        restart = 1;
    }
}

//R (飛) -----
if (chessPosition[xi][yi] == Red(飛))
{
    if (yi == yj)
    {
        for (int i = xi+1; i < xj; i++)
        {
            if (chessPosition[i][yi] != GAP)
                isStandard = 0; //如果初始位置和目標位置之間有棋子，則不符合規則
        }
        for (int i = xi-1; i > xj; i--)
        {
            if (chessPosition[i][yi] != GAP)
                isStandard = 0;
        }
    }
    else if (xi == xj)
    {
        for (int i = yi+1; i < yj; i++)
            if (chessPosition[xi][i] != GAP)
                isStandard = 0;
        for (int i = yi-1; i > yj; i--)
            if (chessPosition[xi][i] != GAP)
                isStandard = 0;
    }
    if ((xi == xj || yi == yj) && isStandard && (redOrBlue(xj, yj) != -1)) //如果棋子直行、沒有犯規且落點不是紅棋，可以移動
    {
        push1(xi); push2(yi); push3(xj); push4(yj); wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Red(飛);
        fprintf(record, "player Y -> xi:%d, yi:%d, xj:%d, yj:%d, goalplace:%s\n", xi, yi, xj, yj, chessPosition[xj][yj]);
        return;
    }
    else
    {
        restart = 1;
    }
}
}
```

Figure 20: [飛] 可到上下左右的任何 1 格



```

//R (桂) -----
else if (chessPosition[xi][yi] == Red(桂))
{
    if ((redOrBlue(xj, yj) != -1) && isStandard && ((xj == xi+2 && yj == yi-1) || (xj == xi+2 && yj == yi+1)))
    {
        push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Red(桂);
        fprintf(record,"player Y -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
        return;
    }
    else
    {
        restart = 1;
    }
}

//B (桂) -----
else if (chessPosition[xi][yi] == Blue(桂))
{
    if ((redOrBlue(xj, yj) != 1) && isStandard && ((xj == xi-2 && yj == yi-1) || (xj == xi-2 && yj == yi+1)))
    {
        push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Blue(桂);
        fprintf(record,"player X -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
        return;
    }
    else
    {
        restart = 1;
    }
}

```

Figure 21: [桂] 每次走右上格或左上格對上之 1 格

```

//R (步) -----
else if (chessPosition[xi][yi] == Red(步))
{
    if (xi > xj)
        isStandard = 0; //如果倒退，則不符合規則
    if (isStandard && redOrBlue(xj, yj) != -1 && (xj == xi+1 && yj == yi)) //
    {
        push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Red(步);
        fprintf(record,"player Y -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
    }
    else
    {
        restart = 1;
    }
}

//B (步) -----
else if (chessPosition[xi][yi] == Blue(步))
{
    if (xi < xj)
        isStandard = 0; //如果倒退，則不符合規則
    if (isStandard && redOrBlue(xj, yj) != 1 && (xj == xi-1 && yj == yi)) //
    {
        push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Blue(步);
        fprintf(record,"player X -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
    }
    else
    {
        restart = 1;
    }
}

```

Figure 22: [步] 每次只可向前 1 格，不能後退

```

//B (角) -----
if (chessPosition[xi][yi] == Blue(角))
{
    int diff=0;
    diff=abs(xi-xj);
    if ((yi<yj)&& (xi<xj))
    {
        int j=yi+1;int i = xi+1;
        for (i,j; i < xj,j<yj; i ++,j++)
        {
            if (chessPosition[i][j] != GAP)
                isStandard = 0; //如果初始位置和目標位置之間有棋子，則不符合規則
        }
        if(xj!=xi+diff||yj!=yi+diff){isStandard=0;}
    }
    if ((yi<yj)&& (xi>xj))
    {
        int j=yi+1;int i = xi-1;
        for (i,j; i > xj,j<yj; i --,j++)
        {
            if (chessPosition[i][j] != GAP)
                isStandard = 0; //如果初始位置和目標位置之間有棋子，則不符合規則
        }
        if(xj!=xi-diff||yj!=yi+diff){isStandard=0;}
    }
}

if ((yi>yj)&& (xi<xj))
{
    int j=yi-1;int i = xi+1;
    for (i, j; i<xj, j>yj; i ++,j--)
    {
        if (chessPosition[i][j] != GAP)
            isStandard = 0; //如果初始位置和目標位置之間有棋子，則不符合規則
    }
    if(xj!=xi+diff||yj!=yi-diff){isStandard=0;}
}

if ((yi>yj)&& (xi>xj))
{
    int j=yi-1;int i = xi-1;
    for (i, j; i >xj, j>yj; i --,j--)
    {
        if (chessPosition[i][j] != GAP)
            isStandard = 0; //如果初始位置和目標位置之間有棋子，則不符合規則
    }
    if(xj!=xi-diff||yj!=yi-diff){isStandard=0;}
}

if ((xi != xj && yi != yj)&& isStandard && (redOrBlue(xj, yj) != 1)) //如果棋子直行、沒有犯規且落點不是藍棋，可以移動
{
    push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
    chessPosition[xi][yi] = GAP;
    chessPosition[xj][yj] = Blue(角);
    fprintf(record,"player X -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
}
else
{
    restart = 1;
}
}

```

Figure 23: [角] 每次可到對角的任何 1 格(英文字母「X」方向)

```

// //R (銀) -----
else if (chessPosition[xi][yi] == Red(銀))
{
    if ((redOrBlue(xj, yj) != -1) && ((xj == xi+1 && yj == yi-1) || (xj == xi+1 && yj == yi+1)
    || (xj == xi+1 && yj == yi) || (xj == xi-1 && yj == yi-1) || (xj == xi-1 && yj == yi+1)))
    {
        {
            push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
            chessPosition[xi][yi] = GAP;
            chessPosition[xj][yj] = Red(銀);
            fprintf(record,"player Y -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
        }
    }
    else
    {
        restart = 1;
    }
}

//B (銀) -----
else if (chessPosition[xi][yi] == Blue(銀))
{
    if ((redOrBlue(xj, yj) != 1) && ((xj == xi-1 && yj == yi-1) || (xj == xi-1 && yj == yi+1)
    || (xj == xi-1 && yj == yi) || (xj == xi+1 && yj == yi-1) || (xj == xi+1 && yj == yi+1)))
    {
        {
            push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
            chessPosition[xi][yi] = GAP;
            chessPosition[xj][yj] = Blue(銀);
            fprintf(record,"player X -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
        }
    }
    else
    {
        restart = 1;
    }
}
}

```

Figure 24: [銀] 每次走前面、右上、右下、左上、左下 1 格

```

//R (金) -----
else if (chessPosition[xi][yi] == Red(金))
{
    if ((redOrBlue(xj, yj) != -1) && ((xj == xi+1 && yj == yi-1) || (xj == xi+1 && yj == yi+1) || (xj == xi+1 && yj == yi)
    || (xj == xi-1 && yj == yi) || (xj == xi && yj == yi-1) || (xj == xi && yj == yi+1)))
    {
        {
            push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
            chessPosition[xi][yi] = GAP;
            chessPosition[xj][yj] = Red(金);
            fprintf(record,"player Y -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
        }
    }
    else
    {
        restart = 1;
    }
}

//B (金) -----
else if (chessPosition[xi][yi] == Blue(金))
{
    if ((redOrBlue(xj, yj) != 1) && ((xj == xi-1 && yj == yi-1) || (xj == xi-1 && yj == yi+1) || (xj == xi-1 && yj == yi)
    || (xj == xi+1 && yj == yi) || (xj == xi && yj == yi-1) || (xj == xi && yj == yi+1)))
    {
        {
            push1(xi);push2(yi);push3(xj);push4(yj);wpush(chessPosition[xj][yj]);
            chessPosition[xi][yi] = GAP;
            chessPosition[xj][yj] = Blue(金);
            fprintf(record,"player X -> xi:%d,yi:%d,xj:%d,yj:%d,goalplace:%s\n",xi,yi,xj,yj,chessPosition[xj][yj]);
        }
    }
    else
    {
        restart = 1;
    }
}
}

```

Figure 25: [金] 每次走前面、右上、右面、左上、左面、下面 1 格

```

//B (香) -----
else if (chessPosition[xi][yi] == Blue(香))
{
    if (xi < xj)
        isStandard = 0; //如果倒退，則不符合規則
    if (yi == yj) //列坐標不變，同列移動
    {
        for (int i = xi-1; i > xj; i --)
        {
            if (chessPosition[i][yi] != GAP) isStandard = 0;
        }

        if ((yi == yj) && isStandard && (redOrBlue(xj, yj) != 1)) //
        {
            push1(xi); push2(yi); push3(xj); push4(yj); wpush(chessPosition[xj][yj]);
            chessPosition[xi][yi] = GAP;
            chessPosition[xj][yj] = Blue(香);
            fprintf(record, "player X -> xi:%d, yi:%d, xj:%d, yj:%d, goalplace:%s\n", xi, yi, xj, yj, chessPosition[xj][yj]);
        }
        else
        {
            restart = 1;
        }
    }
}

```

Figure 26: [香] 每次可向前行任 1 格，但不能後退

```

//R (王) -----
else if (chessPosition[xi][yi] == Red(王))
{
    if ((redOrBlue(xj, yj) != -1) && ((xj == xi-1 && yj == yi-1) || (xj == xi-1 && yj == yi+1) || (xj == xi-1 && yj == yi) ||
    (xj == xi+1 && yj == yi) || (xj == xi+1 && yj == yi+1) || (xj == xi+1 && yj == yi-1) || (xj == xi && yj == yi+1) || (xj == xi && yj == yi-1)))
    {
        push1(xi); push2(yi); push3(xj); push4(yj); wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Red(王);
        fprintf(record, "player Y -> xi:%d, yi:%d, xj:%d, yj:%d, goalplace:%s\n", xi, yi, xj, yj, chessPosition[xj][yj]);
    }
    else
    {
        restart = 1;
    }
}

//B (王) -----
else if (chessPosition[xi][yi] == Blue(王))
{
    if ((redOrBlue(xj, yj) != 1) && ((xj == xi-1 && yj == yi-1) || (xj == xi-1 && yj == yi+1) || (xj == xi-1 && yj == yi) ||
    (xj == xi+1 && yj == yi) || (xj == xi+1 && yj == yi+1) || (xj == xi+1 && yj == yi-1) || (xj == xi && yj == yi+1) || (xj == xi && yj == yi-1)))
    {
        push1(xi); push2(yi); push3(xj); push4(yj); wpush(chessPosition[xj][yj]);
        chessPosition[xi][yi] = GAP;
        chessPosition[xj][yj] = Blue(王);
        fprintf(record, "player X -> xi:%d, yi:%d, xj:%d, yj:%d, goalplace:%s\n", xi, yi, xj, yj, chessPosition[xj][yj]);
    }
    else
    {
        restart = 1;
    }
}

```

Figure 27: [王] 向前面、右上、右面、右下、左上、左面、左下、下面 1 格

### 3.規則

當使用者輸入 1，可以決定下一步的位置，(先輸入[段(行)]的數值，再輸入[筋(列)]的數值) 確定要移動的棋子後，在決定放置的位置。如果輸入錯誤，會顯示違反遊戲規則，使用者需要再輸入一次(1/0/s)。若使用者輸入 0，可進行悔棋。悔棋可連續執行，直到回到第一手。當一方進入另外一方前三排的領地，除了王將 (玉將)、金將及已經升級的棋子外，所有棋子都可以選擇是否升變。輸入 s 會儲存從頭到此的下棋資料到 record.txt。若其中一方將對方的王吃掉，遊戲即結束。

### 4.參考資料

- (1) <https://markdown.tw/>
- (2) <https://shogi.hk/Gameplay-of-Japanese-Chess-Shogi/>
- (3) <https://lakesd6531.pixnet.net/blog/post/332858496-%5B%E8%B3%87%E6%96%99%E7%B5%90%E6%A7%8B%5D%E7%94%A8c%E8%AA%9E%E8%A8%80%E8%A3%BD%E4%BD%9C%E5%A0%86%E7%96%8A%28stack%29>
- (4) <https://www.delftstack.com/zh-tw/howto/c/read-file-c/>

### 5. GITHUB 連結

[https://github.com/NCU-DSA-111-1/assignment\\_2-yayi1213/tree/main/110503507\\_assignment\\_3\\_linked%20list](https://github.com/NCU-DSA-111-1/assignment_2-yayi1213/tree/main/110503507_assignment_3_linked%20list)